

**Title:** Design and Testing of the Primary and Secondary Oxygen Regulators for the Flexible Portable Life Support System (FlexPLSS)

**Authors:**

Colin Campbell  
NASA Johnson Space Center

Mark Hepworth  
Carleton Technologies, Inc.  
Cobham Life Support, Mission Systems Division

**Abstract:**

The next generation space suit requires additional capabilities for controlling and adjusting internal pressure compared to that of historical designs. Although the general configuration of the oxygen systems for the next generation space suit is similar or derived from the Apollo and Shuttle Extravehicular Mobility Unit (EMU) with Primary closed loop life support operation and Secondary sourced open loop life support operations, nearly everything else has evolved with new available technologies. For the case of the primary and secondary regulators, the design has gone away from purely mechanical systems actuated with pull-cords or “bicycle cables” to electro-mechanical hybrids that provide the best of both worlds with respect to power draw, reliability, and versatility. This paper discusses the development and testing of a Secondary Oxygen Regulator bench-top prototype along with comparisons of operation with the various prototypes for the Primary Oxygen Regulator.